

Stanford



Martin Pfaller

Postdoctoral Research Fellow, Cardiology

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BIO

I am a postdoc in the group of Alison Marsden, where I focus on cardiovascular blood flow simulations. As a visiting student researcher with Ellen Kuhl at Stanford, I became fascinated with the application of computer simulations to medical problems. I graduated from the Technical University of Munich with a Ph.D., where I co-founded a group dedicated to the prediction of cardiovascular diseases using simulation methods. Since then, my research mission has been to make simulations more accurate and more accessible for clinicians. During my doctoral studies, we enhanced mechanical models by studying the interaction between the myocardium and the pericardium. We demonstrated how model order reduction could be used to speed up model personalization from patient data, such as cine MRI or blood pressure measurements. We also showed how simulations could enable patient-specific therapy planning of radiofrequency catheter ablation in atrial fibrillation. I am currently working on an NIH-funded project to improve reproducibility in blood flow simulations with data curation methods. We are developing a public repository of patient-specific simulations where other scientists can submit their simulations and automatically regain feedback. My long-term vision is to develop combined physics-based and data-based approaches to enable personalized therapies for the cardiovascular system.

HONORS AND AWARDS

- Dissertation Award, Association of German Engineers (VDI) (2019)
- Winner Science Slam, Technical University of Munich (2017)
- Departmental Teaching Award, Technical University of Munich (2017)
- Departmental Teaching Award, Technical University of Munich (2016)
- Exchange Scholarship, German Academic Exchange Service (DAAD) (2013)
- Exchange Scholarship, Prof. Dr.-Ing. Erich Müller-Stiftung (2013)

PROFESSIONAL EDUCATION

- PhD, Technical University of Munich , Mechanical Engineering (2019)
- MSc, Technical University of Munich , Mechanical Engineering (2013)
- BSc, Technical University of Munich , Mechanical Engineering (2012)

STANFORD ADVISORS

- Alison Marsden, Postdoctoral Faculty Sponsor

LINKS

- Google Scholar Profile: https://scholar.google.com/citations?user=_SNRwoYAAAAJ

Publications

PUBLICATIONS

- **Using parametric model order reduction for inverse analysis of large nonlinear cardiac simulations** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Pfaller, M. R., Cruz Varona, M., Lang, J., Bertoglio, C., Wall, W. A.
2020; e3320
- **Automatic mapping of atrial fiber orientations for patient-specific modeling of cardiac electromechanics using image registration** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Hoermann, J. M., Pfaller, M. R., Avena, L., Bertoglio, C., Wall, W. A.
2019; 35 (6): e3190
- **The importance of the pericardium for cardiac biomechanics: from physiology to computational modeling** *BIOMECHANICS AND MODELING IN MECHANOBIOLOGY*
Pfaller, M. R., Hoermann, J. M., Weigl, M., Nagler, A., Chabiniok, R., Bertoglio, C., Wall, W. A.
2019; 18 (2): 503–29
- **An adaptive hybridizable discontinuous Galerkin approach for cardiac electrophysiology** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Hoermann, J. M., Bertoglio, C., Kronbichler, M., Pfaller, M. R., Chabiniok, R., Wall, W. A.
2018; 34 (5): e2959
- **Multiphysics Modeling of the Atrial Systole under Standard Ablation Strategies** *CARDIOVASCULAR ENGINEERING AND TECHNOLOGY*
Hoermann, J. M., Bertoglio, C., Nagler, A., Pfaller, M. R., Bourier, F., Hadamitzky, M., Deisenhofer, I., Wall, W. A.
2017; 8 (2): 205–18
- **On the Role of Mechanics in Chronic Lung Disease** *MATERIALS*
Eskandari, M., Pfaller, M. R., Kuhl, E.
2013; 6 (12): 5639-5658